



Multideck 146

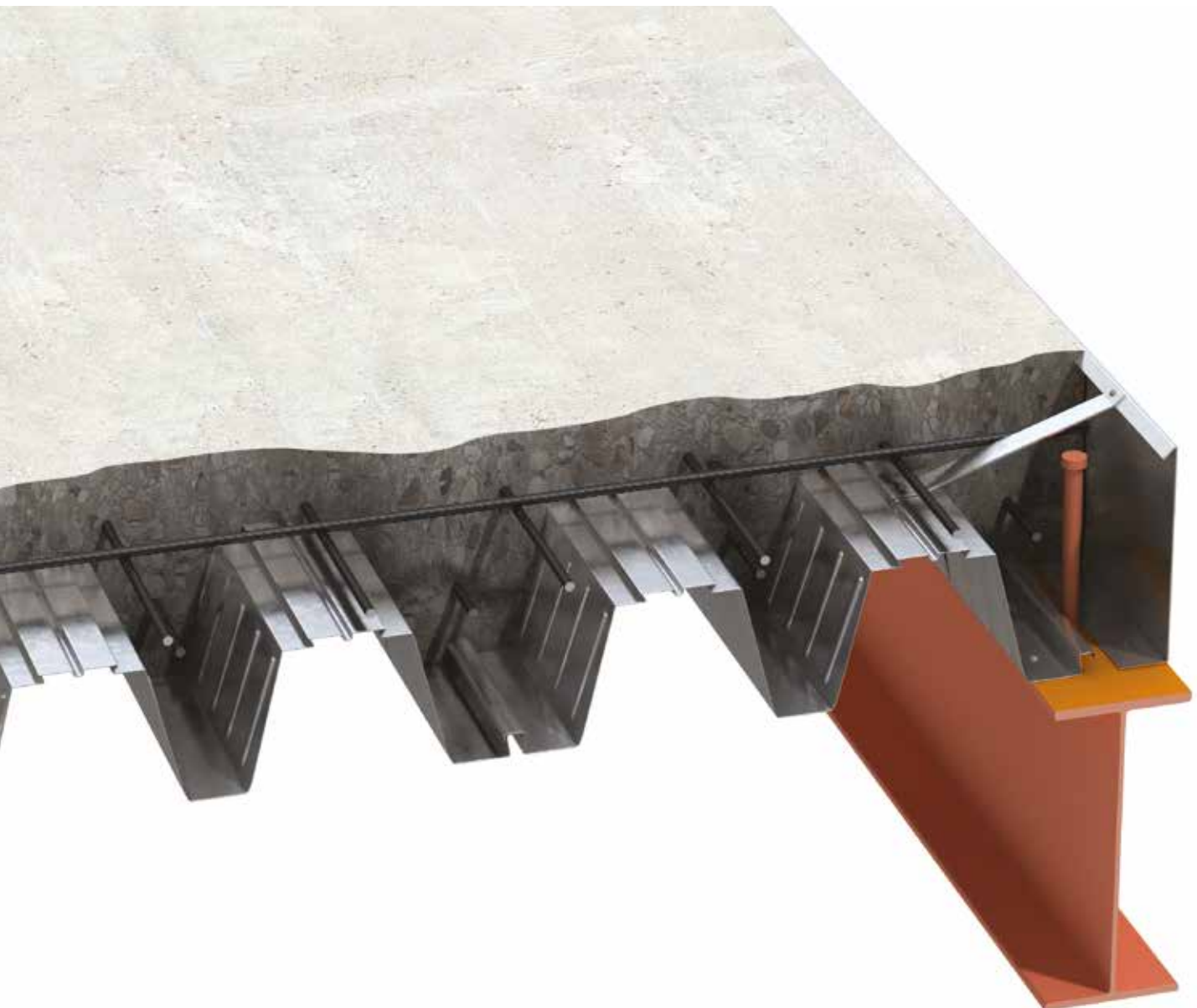
Raised Floor Solutions

Leading approved UK supplier & installer of Kingspan Multideck

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Introduction

Multideck 146 has been engineered to optimise performance of the steel and concrete. No other trapezoidal profile can span as far as Multideck 146. It supports normal weight concrete without the need for props, providing new opportunities for efficiencies in construction.

Multideck 146 should be considered for projects with spanning requirements of 4.0m and above.

Multideck 146 Floor Decking System

The deck can be supported on the top flange of a beam or partnered with ultra shallow fabricated beams to produce a truly shallow floor construction of 215mm depth.

Key benefits include:

- **Prefixed Studs**
Multideck 146 is a single spanning deck so it is ideal for use with beams that have the shear studs attached in the fabrication shop avoiding, or vastly reducing, the need to through deck stud weld on site. While Multideck 146 is generally used with 19mm diameter shear studs it can be equally used with other types of shear attachments as long as the deck is provided with a minimum bearing of 50mm. Multideck 146 can be through deck stud welded on site without difficulty.
- **Concrete Volume Savings**
Multideck 146 composite steel deck is optimised to minimise the concrete volumes on longer spans providing significant savings in comparison to traditional trapezoidal steel decks used free spanning or propped.
Multideck 146 requires 31% less concrete than the next best spanning 80mm trapezoidal deck of the equivalent slab depth.
The saving in concrete translates into a saving in weight that the structure must support, resulting in economies in the supporting structure and foundations.
- **Technical Support**
Kingspan Toolkit software includes comprehensive composite floor design software which allows the user to easily select the right Multideck solution. The design software is available for download from the web site www.kingspanstructural.com.
The Multideck design department provides a comprehensive engineering and advisory service to specifiers and end users on the use of the Multideck range of composite decks.
- **Greater Design Efficiency**
Multideck 146 enhances the performance of the Multideck family of composite steel decks providing efficient spanning capacities to beyond 6.0m. There is a Multideck profile to suit each and every requirement.
- **Quicker Installation**
Multideck 146 deck is 600mm wide and with no need for temporary props, even on spans of 6.0m, means this deck is quick to install.
Reduced concrete volumes means quicker laying times and fewer concrete deliveries to site.

Product Data

Material Specification – 350N/mm² Steel

Steel strip used in the manufacture of Multideck 146 complies with BS EN 10143 and BS EN 10346 with a guaranteed minimum yield strength of 350N/mm² and a minimum total (total both sides) coating mass of 275 gram/m².

Concrete Volumes and Specification

Load / span tables are based on Grade C25/30 concrete, having a cube strength of 30N/mm².

Density of normal weight concrete: 2400kg/m³ at wet stage.

Density of lightweight concrete: 1900kg/m³ at wet stage.

All concrete used with Multideck in the construction of composite slabs should comply with the recommendations in BS 8110: 1997.

Rake Cutting

Pre-delivery cutting of sections is available. Please contact our Sales Department for details.

Embossments

Raised diagonal embossments in opposite directions on each face of the webs, provide mechanical connection between the steel deck and the hardened concrete.

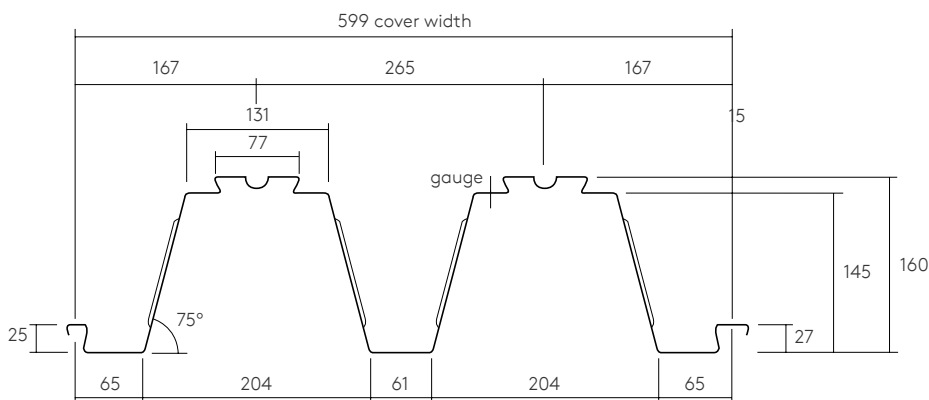
Reinforcement

Reinforcement of the concrete slab to control cracking at all supports is required in accordance with BS EN 5950 Part 4: 1994. Steel reinforcement for crack control or fire performance engineering should be in accordance with British Standards. Hot rolled bars BS EN 4449. Fabric reinforcement BS 4483: 2005.

References

Engineers are advised to consult the SCI / MCRMA publication P300 Composite Slabs and beams using steel decking: Best practice for Design and Construction.

Profile and Dimensions (mm)



Gauges: 1.2mm and 1.5mm
Maximum length: 14.0m



Section Properties per Metre Width

Normal Thickness (mm)	Self Weight		Height to Neutral Axis Sagging (mm)	Second Moment of Area (cm ⁴ /m)	Steel Area (mm ² /m)	Ultimate Moment Capacity (kNm/m)
	(kg/m ²)	(kN/m ²)				Sagging
1.2	19.4	0.191	78.8	836	2400	32.4
1.5	24.3	0.239	79.9	1080	3020	42.3

Volume and Weight of Composite Slabs on Multideck 146

Slab Depth (mm)	Concrete Volume (m ³ /m ²)	Weight (kN/m ²)			
		Normal Weight Concrete		Lightweight Concrete	
		Wet	Dry	Wet	Dry
215	0.128	3.014	2.951	2.386	2.260
225	0.138	3.249	3.181	2.572	2.437
235	0.148	3.485	3.412	2.759	2.613
245	0.158	3.720	3.642	2.945	2.790
255	0.168	3.955	3.873	3.131	2.967
265	0.178	4.191	4.104	3.318	3.143
275	0.188	4.426	4.334	3.504	3.320
285	0.198	4.662	4.565	3.691	3.496
295	0.208	4.897	4.795	3.877	3.673
305	0.218	5.133	5.026	4.063	3.849

Notes:

1. Important – concrete volumes do not take into account deflection.
2. Excludes weight of steel decking and relates only to weight of concrete.
3. Concrete volumes are based upon a calculated minimum value (nominal slab depth).
Account should be taken of deck and supporting structure deflections.

Reinforcement

Reinforcement to Concrete Composite Slab

The Multideck 146 composite concrete slab is always reinforced with one 16mm diameter bar in every trough and a suitable steel mesh reinforcement positioned near the top of the concrete slab.

16mm Diameter Bar Reinforcement

The Multideck 146 composite concrete slab requires a 16mm diameter rod positioned in every trough at 60mm height (from bottom of the deck). This bar reinforcement works in conjunction with the 146 steel deck to enhance the composite and fire design stage performance.

In some cases the bar reinforcement will need to be anchored, this can be achieved by sufficient overlap of the bars over internal supports. On external supports the anchorage can be provided by U bars if present, or by creating a 90° bend at the end of the bar over the support.



Note:

Bar shown in central trough only for clarity. All troughs should include bar reinforcement. Spacer system by specialist manufacturer.

Mesh Reinforcement

Mesh is required to control the cracking that can occur in the concrete due to shrinkage or stresses in the concrete. BS EN 5950 part 4 recommends that the mesh area is a minimum of 0.1% of the cross sectional area of the concrete slab.

The engineer should increase the mesh area where:

- the slab is propped;
- the size of cracks in the concrete needs to be minimised;
- brittle finishes are applied to the slab surface;
- moving wheel loads or point loads are applied to the slab.

Mesh reinforcement should be placed near the upper edge of the concrete slab, in a zone of 15mm to 40mm.

Mesh sheets must be overlapped, use of flying ends make overlapping easier and avoid build up of the mesh thickness at overlaps.

The mesh should be supported on suitable mesh stools to maintain the required mesh position.

U bars are required at composite edge beams with shear studs, as on all other concrete composite steel deck floors supported on composite beams.



Load / Span Tables

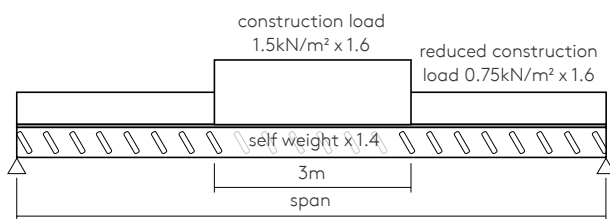
Load / Span Tables

When using load tables for Multideck 146 please take into consideration the following notes:

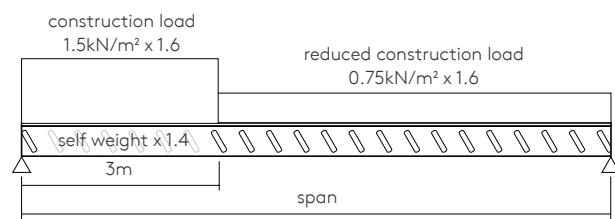
- All tabulated figures include the self weight of the slab.
- All tabulated figures include a construction allowance of 1.5kN/m^2 over a length of 3.0m and 0.75kN/m^2 over the remainder of the span. The 1.5kN/m^2 is positioned at mid span for bending moment and adjacent to the support for shear (see diagram).
- All tabulated values are based on use of concrete grade C25/30.
- All tabulated loads include ponding of the wet concrete due to the deflection of the Multideck 146.
Additional concrete due to the deflection of the supports (beams) is not included in the table. Use the Toolkit Software to check solutions with additional loading to account for support deflection.
- The suggested maximum ratios of slab span to slab depth are 30 for LWC and 35 for NWC to control deflections.
- Deflection under construction loading (wet concrete etc.) has been limited to that stipulated in BS 5950: Part 4 1994.
- Minimum reinforcement mesh sizes shown provide both 0.1% of the gross cross-sectional area and 0.2% of the cross sectional area above the ribs of the concrete at the support.
Minimum reinforcement should be increased where the slab is propped or there are moving loads, or concrete crack size is a consideration i.e. where brittle finishes are required.
Mesh reinforcement should be placed near the upper edge of the concrete slab, in a zone of 15mm to 40mm .
- All values require a minimum of one 16mm diameter bar, grade B500, in each trough positioned at 60mm height
- Line loads and / or point loading may require additional local reinforcement. Use the Multideck design software.
- Total applied load referred to in the load tables is a working load based on factored combinations of live loads, finishes, ceilings, services and partitions, divided by a load factor of 1.60 (excluding slab self weight).
- Temporary supports should remain in place until the concrete has achieved its 75% of the 28 day cube strength often available after 7 days.
- Deck must lie flat on all support beams. Point only contact at the support will affect design loading.
- Span values are centres of supports based on a width of support of 100mm . Minimum of 50mm end bearing on steel or concrete and 75mm on other materials.
- For confirmation of the maximum construction stage unpropped spans see page 113.
- Minimum slab depth is 195mm flush with top of studs but will require a structural cementitious screed for fire insulation.

Definition of Span (construction stage) when using Kingspan Load / Span Tables

Construction load positioned for max bending moment



Construction load positioned for max shear



Load / Span Tables

Normal Weight Concrete (Steel – 350N/mm²) – Unropped Construction

Slab Depth (mm)	Concrete Volume (m ³)	Minimum Mesh Size	Gauge 1.2mm				
			Total Applied Load (kN/m ²)				
			4.0	6.0	8.0	10.0	12.0
Maximum Span (m)							
215	0.128	A142	5.74	5.74	5.74	5.64	5.33
225	0.138	A142	5.67	5.67	5.67	5.67	5.46
235	0.148	A193	5.58	5.58	5.58	5.58	5.58
245	0.158	A193	5.50	5.50	5.50	5.50	5.50
255	0.168	A193	5.43	5.43	5.43	5.43	5.43
265	0.178	A252	5.35	5.35	5.35	5.35	5.35
275	0.188	A252	5.30	5.30	5.30	5.30	5.30
285	0.198	A252	5.24	5.24	5.24	5.24	5.24
295	0.208	A393	5.17	5.17	5.17	5.17	5.17
305	0.218	A393	5.08	5.08	5.08	5.08	5.08

Slab Depth (mm)	Concrete Volume (m ³)	Minimum Mesh Size	Gauge 1.5mm				
			Total Applied Load (kN/m ²)				
			4.0	6.0	8.0	10.0	12.0
Maximum Span (m)							
215	0.128	A142	6.07	6.07	6.07	5.72	5.38
225	0.138	A142	6.00	6.00	6.00	6.00	5.68
235	0.148	A193	5.92	5.92	5.92	5.92	5.92
245	0.158	A193	5.85	5.85	5.85	5.85	5.85
255	0.168	A193	5.77	5.77	5.77	5.77	5.77
265	0.178	A252	5.70	5.70	5.70	5.70	5.70
275	0.188	A252	5.63	5.63	5.63	5.63	5.63
285	0.198	A252	5.57	5.57	5.57	5.57	5.57
295	0.208	A393	5.51	5.51	5.51	5.51	5.51
305	0.218	A393	5.46	5.46	5.46	5.46	5.46

Normal Weight Concrete (Steel – 350N/mm²) – Propped (Mid Span) Construction

Slab Depth (mm)	Concrete Volume (m ³)	Minimum Mesh Size	Gauge 1.5mm				
			Total Applied Load (kN/m ²)				
			4.0	6.0	8.0	10.0	12.0
Maximum Span (m)							
215	0.128	A142	6.45	6.45	6.30	*	*
225	0.138	A142	6.75	6.75	6.70	*	*
235	0.148	A193	7.05	7.05	6.93	*	*
245	0.158	A193	7.35	7.35	6.99	*	*
255	0.168	A193	7.65	7.65	7.05	6.01	*
265	0.178	A252	7.95	7.95	7.08	6.06	*
275	0.188	A252	8.25	8.25	7.12	6.10	*
285	0.198	A252	8.55	8.42	7.14	6.15	*
295	0.208	A393	8.85	8.50	7.17	6.18	*
305	0.218	A393	9.15	8.54	7.19	6.21	*

Notes:

All values require mesh as shown and 16mm diameter bar at 60mm height.

Minimum reinforcement mesh sizes shown provide both 0.1% of the gross cross-sectional area and 0.2% of the cross sectional area above the ribs of the concrete at the support.

* In these cases there is no improvement in span capacity in using propped construction over non propped construction.

Propped values for the 1.2 gauge Multideck 146 should be obtained from the Multideck software.

There is no Dramix® Steel Fibre solution for Multideck 146.



Lightweight Concrete (Steel – 350N/mm²) – Unpropped Construction

Slab Depth (mm)	Concrete Volume (m ³)	Minimum Mesh Size	Gauge 1.2mm				
			Total Applied Load (kN/m ²)				
			4.0	6.0	8.0	10.0	12.0
Maximum Span (m)							
215	0.128	A142	6.06	5.95	5.75	5.28	4.55
225	0.138	A142	5.97	5.97	5.90	5.48	4.69
235	0.148	A193	5.89	5.89	5.89	5.69	4.82
245	0.158	A193	5.81	5.81	5.81	5.81	4.94
255	0.168	A193	5.75	5.75	5.75	5.75	5.00
265	0.178	A252	5.66	5.66	5.66	5.66	5.18
275	0.188	A252	5.60	5.60	5.60	5.60	5.30
285	0.198	A252	5.54	5.54	5.54	5.54	5.41
295	0.208	A393	5.49	5.49	5.49	5.49	5.49
305	0.218	A393	5.42	5.42	5.42	5.42	5.42

Slab Depth (mm)	Concrete Volume (m ³)	Minimum Mesh Size	Gauge 1.5mm				
			Total Applied Load (kN/m ²)				
			4.0	6.0	8.0	10.0	12.0
Maximum Span (m)							
215	0.128	A142	6.44	6.44	5.93	5.55	4.90
225	0.138	A142	6.34	6.34	6.10	5.71	5.04
235	0.148	A193	6.25	6.25	6.25	5.91	5.19
245	0.158	A193	6.14	6.14	6.14	6.09	5.32
255	0.168	A193	6.09	6.09	6.09	6.09	5.45
265	0.178	A252	5.98	5.98	5.98	5.98	5.57
275	0.188	A252	5.95	5.95	5.95	5.95	5.69
285	0.198	A252	5.89	5.89	5.89	5.89	5.83
295	0.208	A393	5.82	5.82	5.82	5.82	5.82
305	0.218	A393	5.75	5.75	5.75	5.75	5.75

Lightweight Concrete (Steel – 350N/mm²) – Propped (Mid Span) Construction

Slab Depth (mm)	Concrete Volume (m ³)	Minimum Mesh Size	Gauge 1.5mm				
			Total Applied Load (kN/m ²)				
			4.0	6.0	8.0	10.0	12.0
Maximum Span (m)							
215	0.128	A142	6.76	*	*	*	*
225	0.138	A142	6.93	*	*	*	*
235	0.148	A193	7.11	6.54	*	*	*
245	0.158	A193	7.31	6.71	*	*	*
255	0.168	A193	7.51	6.93	*	*	*
265	0.178	A252	7.72	7.13	*	*	*
275	0.188	A252	7.93	7.33	*	*	*
285	0.198	A252	8.12	7.52	6.19	*	*
295	0.208	A393	8.33	7.55	6.22	*	*
305	0.218	A393	8.54	7.57	6.26	*	*

Notes:

All values require mesh as shown and 16mm diameter bar at 60mm height.

Minimum reinforcement mesh sizes shown provide both 0.1% of the gross cross-sectional area and 0.2% of the cross sectional area above the ribs of the concrete at the support.

* In these cases there is no improvement in span capacity in using propped construction over non propped construction.

Propped values for the 1.2 gauge Multideck 146 should be obtained from the Multideck software.

There is no Dramix® Steel Fibre solution for Multideck 146.





Fire Resistance

Fire Performance – Mesh

- 1 The fire resistance tables for Multideck 146 on the following pages must be read in conjunction with load / span tables for Multideck 146 to verify the structural integrity of the composite slab.
- 2 The following fire resistance tables for Multideck 146 are based on analysis by the Steel Construction Institute.
- 3 All stated slab depths comply with the minimum fire insulation criteria.
- 4 The composite slab is treated as a single span so the values shown can be used on a single or continuous slab.
- 5 All solutions have a minimum of one 16 bar grade B500 per trough at 60mm height.

The load tables are shown for unanchored and anchored bar reinforcement. Where there are internal supports anchoring the bars can be achieved with a simple overlap. At the end support, U bars around composite shear studs will provide the anchor. Otherwise use bond lengths beyond the inner flange edge and straight or bent bars.

The unanchored solution does not need any additional attachment of the bars.

- 6 Minimum laps should be 300mm for A142 mesh and 400mm for A193, A252 and A393 mesh.
- 7 Mesh reinforcement should be placed near the upper edge of the concrete slab, in a zone of 15mm to 40mm.
- 8 The tables are based upon Grade C25/30 concrete for other grades use the Multideck design software.
- 9 The tables are based on a load factor of 1.0 for the fire case. Further capacity can be achieved by taking into account the reduced partial factor of 0.8 or 0.5 as permitted in BS 5950: Part 8 for non-permanent imposed loads.
- 10 For fire performance on propped construction use the Multideck Design Software.
- 11 Span values are centres of supports based on a width of support of 100mm. Minimum of 50mm end bearing on steel or concrete and 75mm on other materials.

Examples of the applied loads for the fire load tables – load factors from BS5950 part 8.

The load tables are based on a Fire limit state load factor γ_f of 1.0.

For some applications the non permanent loading can use a load factor of γ_f of 0.8 and for office 0.5.

See table 5 BS 5950 part 8 section 7.1.

Case 1 office (general use)

	kN/m ²	Fire limit state load (kN/m ²)
Dead loads	3.75	x 1.0 = 3.75
Super load	2.5	
Non permanent	2.5	x 0.5 = 1.25 office
Load value for fire limit state		5.00

For a 215mm slab with 1.0 hour fire, the max span for anchored bars is 7.05m and for unanchored 6.33m.

Case 2 general (excluding plant and storage)

	kN/m ²	Fire limit state load (kN/m ²)
Dead loads	1.0	x 1.0 = 1.0
Super load	5.0	
Made up of Permanent	3.0	x 1.0 = 3.0
Non permanent	2.0	x 0.8 = 1.6 general
Load value for fire limit state		5.6

For a 225mm slab with 1.5 hour fire, the max span for anchored bars is 6.92m and for unanchored 5.73m.

Always check the load / span capacity to verify the structural capacity and use the lesser of the capacities, fire limit state or structural.

Note:

For load / span conditions beyond the scope of these tables, the Kingspan Multideck design software should be used to check for a solution. Toolkit Design Software provides an accurate and detailed analysis and Kingspan encourages its use for all design checks.

Fire Resistance Load / Span Tables

Anchored 16mm diameter Bar Reinforcement Normal Weight Concrete – Unpropped Construction

Slab Depth (mm)	Concrete Volume (m ³)	Min Mesh Size	Fire Rating 0.5 hour						Fire Rating 1.0 hours							
			Total Applied Load (kN/m ²)						Total Applied Load (kN/m ²)							
			4.0	5.0	6.0	7.0	8.0	10.0	4.0	5.0	6.0	7.0	8.0	10.0	12.0	
			Maximum Span (m) all 146 Gauges						Maximum Span (m) all 146 Gauges							
215	0.128	A142	7.54	7.05	6.65	6.30	6.01	5.53	5.14	7.54	7.05	6.64	6.30	6.01	5.52	5.10
225	0.138	A142	7.67	7.19	6.78	6.44	6.15	5.66	5.27	7.67	7.18	6.78	6.44	6.14	5.66	5.27
235	0.148	A193	7.79	7.31	6.91	6.57	6.27	5.79	5.40	7.78	7.31	6.91	6.57	6.27	5.79	5.40
245	0.158	A193	7.89	7.42	7.03	6.69	6.39	5.91	5.52	7.89	7.42	7.03	6.69	6.39	5.91	5.52
255	0.168	A193	7.99	7.53	7.14	6.80	6.51	6.02	5.63	7.99	7.53	7.14	6.80	6.51	6.02	5.63
265	0.178	A252	8.08	7.63	7.24	6.91	6.61	6.13	5.73	8.08	7.63	7.24	6.91	6.61	6.13	5.73
275	0.188	A252	8.17	7.72	7.34	7.01	6.72	6.23	5.84	8.17	7.72	7.34	7.01	6.72	6.23	5.84
285	0.198	A252	8.25	7.81	7.43	7.10	6.81	6.33	5.93	8.25	7.81	7.43	7.10	6.81	6.33	5.92
295	0.208	A393	8.33	7.89	7.52	7.19	6.90	6.42	6.03	8.33	7.89	7.52	7.19	6.90	6.42	5.96
305	0.218	A393	8.40	7.97	7.60	7.28	6.99	6.51	6.12	8.40	7.97	7.60	7.28	6.99	6.51	6.01

Slab Depth (mm)	Concrete Volume (m ³)	Min Mesh Size	Fire Rating 1.5 hour						Fire Rating 2.0 hours							
			Total Applied Load (kN/m ²)						Total Applied Load (kN/m ²)							
			4.0	5.0	6.0	7.0	8.0	10.0	4.0	5.0	6.0	7.0	8.0	10.0	12.0	
			Maximum Span (m) all 146 Gauges						Maximum Span (m) all 146 Gauges							
215	0.128	A142	-	-	-	-	-	-	-	-	-	-	-	-	-	-
225	0.138	A142	7.64	7.16	6.76	6.42	6.12	5.64	4.90	-	-	-	-	-	-	-
235	0.148	A193	7.76	7.28	6.89	6.55	6.25	5.77	5.07	7.62	7.15	6.76	6.43	6.14	5.51	4.80
245	0.158	A193	7.87	7.40	7.00	6.67	6.37	5.89	5.23	7.73	7.27	6.88	6.55	6.26	5.70	4.97
255	0.168	A193	7.97	7.51	7.12	6.78	6.49	6.00	5.38	7.83	7.37	6.99	6.66	6.37	5.87	5.13
265	0.178	A252	8.06	7.61	7.22	6.89	6.60	6.11	5.49	7.92	7.47	7.09	6.77	6.48	5.99	5.25
275	0.188	A252	8.15	7.70	7.32	6.99	6.70	6.21	5.56	8.00	7.56	7.19	6.86	6.58	6.07	5.33
285	0.198	A252	8.23	7.79	7.41	7.08	6.79	6.31	5.62	8.08	7.65	7.28	6.96	6.67	6.14	5.40
295	0.208	A393	8.30	7.87	7.50	7.17	6.88	6.40	5.68	8.16	7.73	7.36	7.04	6.76	6.20	5.46
305	0.218	A393	8.38	7.95	7.58	7.26	6.97	6.49	5.73	8.23	7.81	7.44	7.13	6.85	6.26	5.52

Note:

These values are for unpropped spans only. For cases where the deck is propped please use the Kingspan Toolkit Software.

Anchored 16mm diameter Bar Reinforcement Lightweight Concrete – Unpropped Construction

Slab Depth (mm)	Concrete Volume (m ³)	Min Mesh Size	Fire Rating 0.5 hour						Fire Rating 1.0 hours							
			Total Applied Load (kN/m ²)						Total Applied Load (kN/m ²)							
			4.0	5.0	6.0	7.0	8.0	10.0	12.0	4.0	5.0	6.0	7.0	8.0	10.0	12.0
			Maximum Span (m) all 146 Gauges						Maximum Span (m) all 146 Gauges							
215	0.128	A142	7.95	7.38	6.92	6.54	6.21	5.68	5.27	7.95	7.38	6.92	6.54	6.21	5.68	5.27
225	0.138	A142	8.10	7.54	7.08	6.69	6.36	5.83	5.41	8.10	7.54	7.08	6.69	6.36	5.83	5.41
235	0.148	A193	8.24	7.68	7.22	6.84	6.51	5.97	5.54	8.24	7.68	7.22	6.84	6.51	5.97	5.54
245	0.158	A193	8.37	7.82	7.36	6.97	6.64	6.10	5.67	8.37	7.82	7.38	6.97	6.64	6.10	5.67
255	0.168	A193	8.50	7.94	7.49	7.10	6.77	6.23	5.80	8.50	7.94	7.49	7.10	6.77	6.23	5.80
265	0.178	A252	8.61	8.08	7.61	7.23	6.89	6.35	5.91	8.61	8.06	7.61	7.23	6.89	6.35	5.91
275	0.188	A252	8.72	8.18	7.73	7.34	7.01	6.46	6.03	8.72	8.18	7.73	7.34	7.01	6.46	6.03
285	0.198	A252	8.82	8.29	7.84	7.45	7.12	6.57	6.13	8.82	8.29	7.84	7.45	7.12	6.57	6.13
295	0.208	A393	8.92	8.39	7.94	7.56	7.23	6.68	6.24	8.92	8.39	7.94	7.56	7.23	6.68	6.24
305	0.218	A393	9.01	8.48	8.04	7.66	7.33	6.78	6.34	9.01	8.48	8.04	7.66	7.33	6.78	6.34

Slab Depth (mm)	Concrete Volume (m ³)	Min Mesh Size	Fire Rating 1.5 hour						Fire Rating 2.0 hours							
			Total Applied Load (kN/m ²)						Total Applied Load (kN/m ²)							
			4.0	5.0	6.0	7.0	8.0	10.0	12.0	4.0	5.0	6.0	7.0	8.0	10.0	12.0
			Maximum Span (m) all 146 Gauges						Maximum Span (m) all 146 Gauges							
215	0.128	A142	7.95	7.38	6.92	6.54	6.21	5.68	5.27	-	-	-	-	-	-	-
225	0.138	A142	8.10	7.54	7.08	6.69	6.36	5.83	5.41	8.10	7.54	7.08	6.69	6.36	5.83	5.41
235	0.148	A193	8.24	7.68	7.22	6.84	6.51	5.97	5.54	8.24	7.68	7.22	6.84	6.51	5.97	5.54
245	0.158	A193	8.37	7.82	7.36	6.97	6.64	6.10	5.67	8.37	7.82	7.36	6.97	6.64	6.10	5.67
255	0.168	A193	8.50	7.94	7.49	7.10	6.77	6.23	5.80	8.50	7.94	7.49	7.10	6.77	6.23	5.80
265	0.178	A252	8.61	8.06	7.61	7.23	6.89	6.35	5.91	8.61	8.06	7.61	7.23	6.89	6.35	5.91
275	0.188	A252	8.72	8.18	7.73	7.34	7.01	6.46	6.03	8.72	8.18	7.73	7.34	7.01	6.46	6.03
285	0.198	A252	8.82	8.29	7.84	7.45	7.12	6.57	6.13	8.82	8.29	7.84	7.45	7.12	6.57	6.13
295	0.208	A393	8.92	8.39	7.94	7.56	7.23	6.68	6.34	8.92	8.39	7.94	7.56	7.23	6.68	6.24
305	0.218	A393	9.01	8.48	8.04	7.66	7.33	6.78	6.34	9.01	8.48	8.04	4.66	7.33	6.78	6.34

Note:

These values are for unpropped spans only. For cases where the deck is propped please use the Kingspan Toolkit Software.



Multideck 50



Multideck 60



Multideck 80



Multideck 146

Fire Resistance Load / Span Tables

Unanchored 16mm diameter Bar Reinforcement Normal Weight Concrete – Unpropped Construction

Slab Depth (mm)	Concrete Volume (m ³)	Min Mesh Size	Fire Rating 0.5 hour						Fire Rating 1.0 hours							
			Total Applied Load (kN/m ²)						Total Applied Load (kN/m ²)							
			4.0	5.0	6.0	7.0	8.0	10.0	4.0	5.0	6.0	7.0	8.0	10.0	12.0	
			Maximum Span (m) all 146 Gauges						Maximum Span (m) all 146 Gauges							
215	0.128	A142	7.54	6.71	5.96	5.36	4.87	4.12	3.57	7.24	6.33	5.62	5.06	4.59	3.88	3.36
225	0.138	A142	7.67	6.97	6.21	5.60	5.10	4.32	3.75	7.51	6.59	5.87	5.30	4.82	4.09	3.55
235	0.148	A193	7.79	7.21	6.44	5.82	5.31	4.52	3.93	7.77	6.84	6.12	5.53	5.04	4.29	3.74
245	0.158	A193	7.89	7.42	6.66	6.04	5.52	4.71	4.11	7.89	7.08	6.35	5.75	5.26	4.49	3.91
255	0.168	A193	7.99	7.53	6.88	6.24	5.72	4.89	4.28	7.99	7.31	6.57	5.96	5.46	4.67	4.08
265	0.178	A252	8.08	7.63	7.01	6.38	5.85	5.02	4.40	8.08	7.45	6.71	6.11	5.60	4.81	4.21
275	0.188	A252	8.17	7.72	7.08	6.45	5.93	5.10	4.48	8.17	7.52	6.79	6.19	5.69	4.90	4.30
285	0.198	A252	8.25	7.81	7.14	6.52	6.00	5.18	4.55	8.25	7.58	6.86	6.27	5.77	4.98	4.38
295	0.208	A393	8.33	7.89	7.19	6.58	6.07	5.25	4.62	8.33	7.63	6.93	6.34	5.84	5.05	4.45
305	0.218	A393	8.40	7.97	7.24	6.64	6.13	5.32	4.69	8.40	7.68	6.99	6.41	5.91	5.13	4.53

Slab Depth (mm)	Concrete Volume (m ³)	Min Mesh Size	Fire Rating 1.5 hour						Fire Rating 2.0 hours							
			Total Applied Load (kN/m ²)						Total Applied Load (kN/m ²)							
			4.0	5.0	6.0	7.0	8.0	10.0	4.0	5.0	6.0	7.0	8.0	10.0	12.0	
			Maximum Span (m) all 146 Gauges						Maximum Span (m) all 146 Gauges							
215	0.128	A142	-	-	-	-	-	-	-	-	-	-	-	-	-	-
225	0.138	A142	6.99	6.13	5.46	4.93	4.49	3.81	3.30	-	-	-	-	-	-	-
235	0.148	A193	7.26	6.39	5.72	5.17	4.71	4.01	3.49	6.87	6.05	4.51	4.89	4.46	3.80	3.30
245	0.158	A193	7.51	6.64	5.96	5.40	4.93	4.21	3.67	7.14	6.31	5.66	5.12	4.68	4.00	3.49
255	0.168	A193	7.75	6.88	6.18	5.62	5.14	4.40	3.85	7.39	6.56	5.89	5.35	4.90	4.19	3.66
265	0.178	A252	7.91	7.04	6.34	5.77	5.30	4.54	3.98	7.56	6.73	6.06	5.51	5.06	4.34	3.80
275	0.188	A252	7.98	7.12	6.44	5.87	5.39	4.64	4.07	7.64	6.82	6.16	5.62	5.16	4.44	3.90
285	0.198	A252	8.04	7.20	6.52	5.96	5.48	4.73	4.16	7.72	6.91	6.26	5.72	5.26	4.54	3.99
295	0.208	A393	8.10	7.27	6.60	6.04	5.57	4.81	4.24	7.79	6.99	6.35	5.81	5.35	4.63	4.08
305	0.218	A393	8.15	7.34	6.67	6.12	5.65	4.89	4.32	7.85	7.07	6.43	5.89	5.44	4.72	4.16

Note:

These values are for unpropped spans only. For cases where the deck is propped please use the Kingspan Toolkit Software.



Unanchored 16mm diameter Bar Reinforcement Lightweight Concrete – Unpropped Construction

Slab Depth (mm)	Concrete Volume (m ³)	Min Mesh Size	Fire Rating 0.5 hour						Fire Rating 1.0 hours							
			Total Applied Load (kN/m ²)						Total Applied Load (kN/m ²)							
			4.0	5.0	6.0	7.0	8.0	10.0	4.0	5.0	6.0	7.0	8.0	10.0	12.0	
			Maximum Span (m) all 146 Gauges						Maximum Span (m) all 146 Gauges							
215	0.128	A142	7.95	7.38	6.59	5.88	5.30	4.44	3.82	7.95	7.38	6.50	5.80	5.24	4.38	3.77
225	0.138	A142	8.10	7.54	6.88	6.15	5.56	4.67	4.02	8.10	7.54	6.80	6.08	5.50	4.61	3.97
235	0.148	A193	8.24	7.68	7.16	6.41	5.81	4.89	4.22	8.24	7.68	7.08	6.34	5.75	4.83	4.17
245	0.158	A193	8.37	7.82	7.36	6.67	6.05	5.11	4.41	8.37	7.82	7.35	6.60	5.99	5.05	4.37
255	0.168	A193	8.50	7.94	7.49	6.92	6.29	5.32	4.61	8.50	7.94	7.49	6.85	6.22	5.26	4.56
265	0.178	A252	8.61	8.06	7.61	7.09	6.45	5.47	4.75	8.61	8.06	7.61	7.02	6.39	5.42	4.70
275	0.188	A252	8.72	8.18	7.73	7.19	6.55	5.57	4.84	8.72	8.18	7.73	7.12	6.49	5.52	4.80
285	0.198	A252	8.82	8.29	7.84	7.28	6.65	5.66	4.93	8.82	8.29	7.84	7.22	6.59	5.61	4.89
295	0.208	A393	8.92	8.39	7.94	7.37	6.74	5.75	5.02	8.92	8.39	7.94	7.31	6.68	5.70	4.98
305	0.218	A393	9.01	8.48	8.04	7.45	6.82	5.84	5.10	9.01	8.48	8.04	7.39	6.77	5.79	5.06

Slab Depth (mm)	Concrete Volume (m ³)	Min Mesh Size	Fire Rating 1.5 hour						Fire Rating 2.0 hours							
			Total Applied Load (kN/m ²)						Total Applied Load (kN/m ²)							
			4.0	5.0	6.0	7.0	8.0	10.0	4.0	5.0	6.0	7.0	8.0	10.0	12.0	
			Maximum Span (m) all 146 Gauges						Maximum Span (m) all 146 Gauges							
215	0.128	A142	7.95	7.27	6.39	5.70	5.14	4.30	3.70	-	-	-	-	-	-	-
225	0.138	A142	8.10	7.54	6.69	5.98	5.40	4.54	3.91	8.10	7.42	6.54	5.84	5.28	4.43	3.82
235	0.148	A193	8.24	7.68	6.97	6.24	5.66	4.76	4.11	8.24	7.68	6.82	6.11	5.54	4.66	4.02
245	0.158	A193	8.37	7.82	7.24	6.50	5.90	4.98	4.30	8.37	7.82	7.10	6.37	5.78	4.88	4.22
255	0.168	A193	8.50	7.94	7.49	6.75	6.14	5.19	4.50	8.50	7.94	7.36	6.63	6.02	5.09	4.41
265	0.178	A252	8.61	8.06	7.61	6.93	6.31	5.35	4.64	8.61	8.06	7.55	6.81	6.19	5.25	4.56
275	0.188	A252	8.72	8.18	7.73	7.03	6.41	5.45	4.74	8.72	8.18	7.66	6.91	6.30	5.36	4.66
285	0.198	A252	8.82	8.29	7.84	7.13	6.51	5.55	4.83	8.82	8.29	7.76	7.02	6.41	5.46	4.75
295	0.208	A393	8.92	8.39	7.94	7.22	6.61	5.64	4.92	8.92	8.39	7.85	7.11	6.50	5.55	4.84
305	0.218	A393	9.01	8.48	8.04	7.31	6.70	5.73	5.01	9.01	8.48	7.94	7.20	6.60	5.64	4.93

Note:

These values are for unpropped spans only. For cases where the deck is propped please use the Kingspan Toolkit Software.

Sound Attenuation

Predicted Site Acoustic Performance of Floors with Multideck 146

Slab Depth (mm)	Predicted Acoustic Performance $D_nT_{w} + C_{tr}$ (dB) for Airborne Sound				
	Description of Floor				
	Slab on Deck with no Ceiling and no Floor Treatment	Slab on Deck with Ceiling and no Floor Treatment	Slab on Deck with Ceiling and Platform Floor (FFT4)	Slab on Deck with Ceiling and Battened Floor (FFT3)	Slab on Deck with Ceiling and Isolated Screed
215	35 to 39	49 to 53	48 to 52	50 to 54	49 to 53
225	36 to 40	50 to 54	49 to 53	51 to 55	50 to 54
235	37 to 41	51 to 55	50 to 54	52 to 56	51 to 55
245	38 to 42	52 to 56	51 to 55	53 to 57	52 to 56
255	39 to 43	53 to 57	52 to 56	54 to 58	53 to 57
265	40 to 44	54 to 58	53 to 57	55 to 59	54 to 58
275	41 to 45	55 to 59	54 to 58	56 to 60	55 to 59
285	41 to 45	55 to 59	54 to 58	56 to 60	55 to 59
295	42 to 46	56 to 60	55 to 59	57 to 61	56 to 60
305	43 to 47	57 to 61	56 to 60	58 to 62	57 to 61

Slab Depth (mm)	Predicted Acoustic Performance $L'_{nT,w}$ (dB) for Impact Sound				
	Description of Floor				
	Slab on Deck with no Ceiling and no Floor Treatment	Slab on Deck with Ceiling and no Floor Treatment	Slab on Deck with Ceiling and Platform Floor (FFT4)	Slab on Deck with Ceiling and Battened Floor (FFT3)	Slab on Deck with Ceiling and Isolated Screed
215 to 305	78 to 82	70 to 74	51 to 55	52 to 56	48 to 52

Note:

Values shown shaded are not sufficient for separating floors in residential buildings.

For floor systems which comprise a composite slab (depth = 215 to 305mm) on Multideck 146 deck, a suspended ceiling and a floor treatment, the airborne and impact sound insulation provided will easily satisfy the requirements for separating floors in residential buildings.

The junction details between the walls and floors must be appropriately detailed to ensure flanking sound is minimised.

Kingspan Insulated Panels' Structural Products & Systems sub-division is a member of The Steel Construction Institute and has undertaken extensive testing on the acoustic performance of the Multideck range of composite steel slabs. The testing was carried out on behalf of Kingspan by The Steel Construction Institute and resulted in a comprehensive report: 'Acoustic Performance of Kingspan Composite Floors', copies of which can be obtained from our Technical Services Department.





Multideck 50



Multideck 60



Multideck 80



Multideck 146